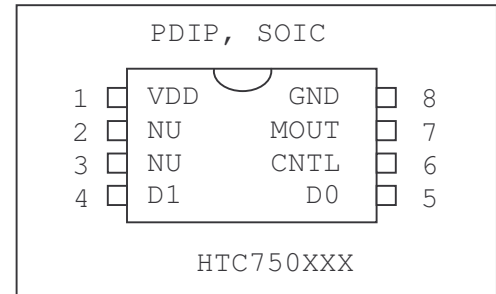

Melody Generator

1.0 General Description

This circuit is designed to work as a melody generator. HTC750 will play the selected melody (selection is done by driving D0 and D1 inputs to a low or high value) and once the melody is finished it will enter the power saving mode, which we call Sleep mode. In Sleep mode HTC750 consumes less than a few micro amps of current. One of the possible uses of HTC750 is in a doorbell. This device was designed using our proprietary melody storing scheme to optimize internal memory usage. HTC750 can play up to four melodies. It can directly drive a piezo-electrical sound source or with use of external amplifier can drive speakers. Control output is provided to control external relay or the power switch. This output goes high for a duration of the melody and could be used to control the power to HTC750 and an amplifier for the duration of the melody.



Possible uses are:

- Musical doorbell
- Melody generator for alarm clock
- Musical toys
- Musical boxes for gifts, accessories or jewelry

Features:

- Single chip solution
- Minimum external components
- Four selectable melodies
- Minimum power consumption while in Sleep mode

Doorbell design using HTC750

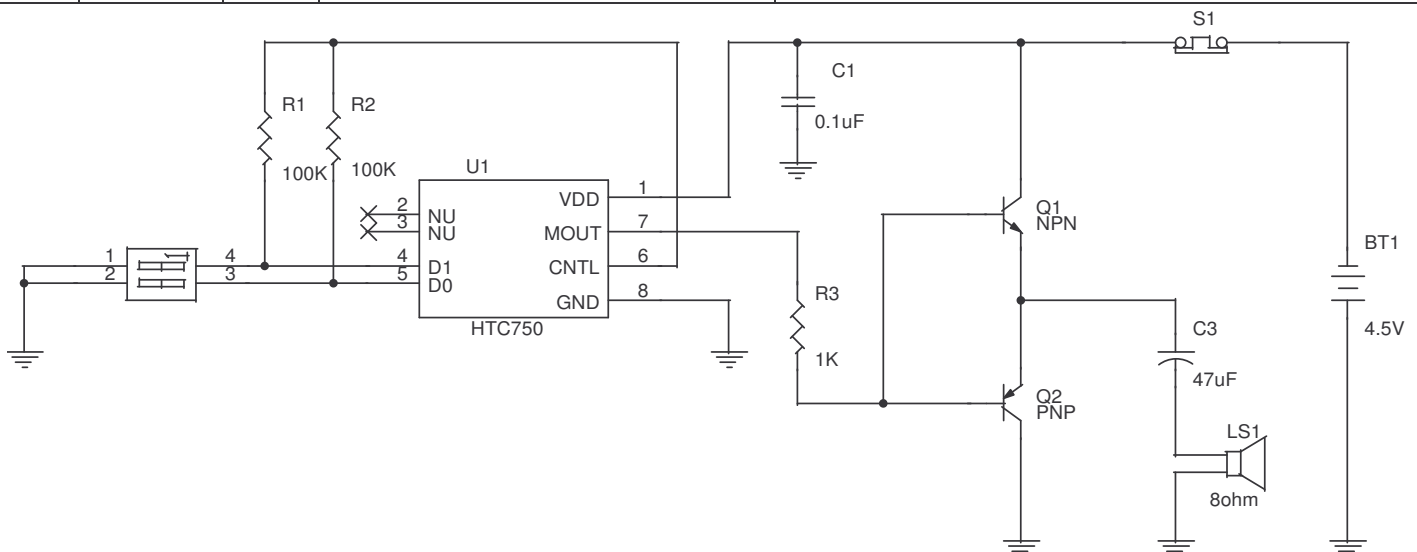
2.0 Functional Description

We will use the schematics above to describe HTC750's operation. At power up HTC750 plays the melody set by the dip-switch. After finishing the melody, it goes into sleep mode and drives all outputs to GND. In the prototypes we built using the above schematics, current consumption was less than 10uA. This current is negligible enough to leave the circuit constantly powered on. When the device is in Sleep mode, the only way of waking up the circuit is to recycle power. This is done using the S1 pushbutton. Note that we are using the pushbutton with normal closed contacts. When this pushbutton is activated, power to HTC750 is cut down, and when this pushbutton is released the melody will be played. One can use the pushbutton with normal open contacts but it could result in partial reproduction of the melody. Note the way the CNTL output is used to save energy during Sleep mode. Energy saving is achieved by cutting power to the R1 and R2 resistors when Sleep mode is entered and preventing battery discharge through these resistors when the associated dip-switch is on. T1 and T2 form simple current amplifiers to drive a 8-ohm speaker. Almost any small signal transistor can be used in this amplifier. Note that this amplifier will introduce additional distortions to the amplified signal, because the transistors are not biased. This is done intentionally to simplify the amplifier circuit and add one distinct character. This amplifier does not use any current when its input is driven low. Any other amplifier circuit could be used as long as care is taken to shut down the amplifier with the CNTL output of HTC750 to save battery power. This could be done by external relay. Quality of sound could be further enhanced if a low pass filter is added to the output of HTC750 (Please see the application note for HTC750).

Pin out Description

Abbreviations used: O - output, I - input, P - power

Pin	Name	I / O	Description	Notes
1	VDD	P	Power	+2.5V to +5.5V
2	NU	I	Not Used	Tie it to GND or VDD
3	NU	I	Not Used	Tie it to GND or VDD



4	D1	I	Melody selection input.	Tie it to GND or VDD
5	D0	I	Melody selection input.	Tie it to GND or VDD
6	CNTL	O	Control output	This output is driven high when the melody is played, can deliver up to 25mA of current.
7	MOUT	O	Melody output	Signal on this output is square wave
8	GND	P	Ground	Connect to ground

3.0 Melody Selection with D[0:1]

D1	D0	MELODY
GND	GND	Number 1
GND	VDD	Number 2
VDD	GND	Number 3
VDD	GND	Number 4

This table shows the melody played when D0 and D1 are tied to the ground or power. Note that this part comes with different sets of melodies and these melody samples will be made available for download.

4.0 Electrical Characteristics

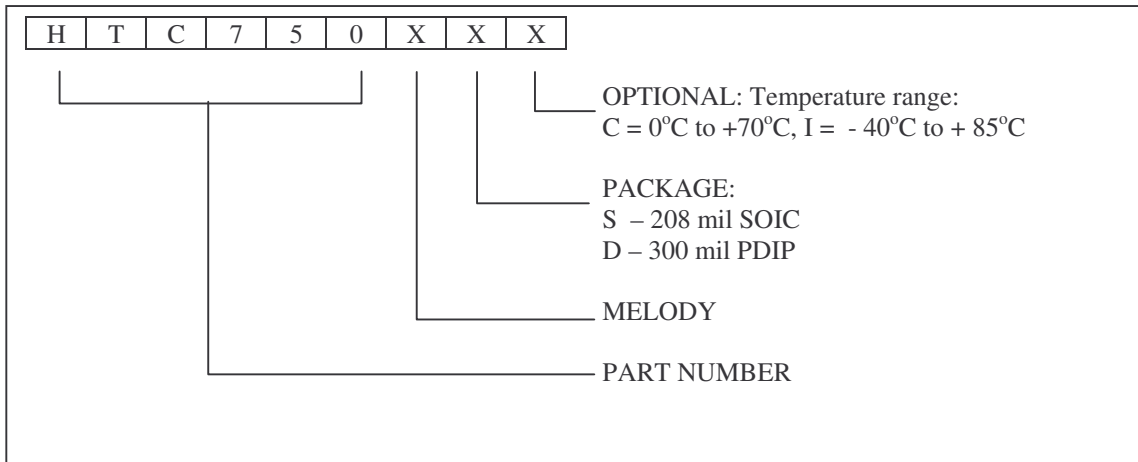
Voltage on VDD pin in respect to GND	+2.5 to +5.5V
Operational current with no external load	3 mA ¹
Current used in SLEEP mode	4uA ¹
MOUT output low voltage max (5mA load)	0.4V ¹
MOUT output high voltage min (5mA source)	VDD-0.7V ¹
MOUT maximum sink current	25mA ¹
MOUT maximum source current	25mA ¹
CNTL output low voltage max (5mA load)	0.4V ¹
CNTL output high voltage min (5mA source)	VDD-0.7V ¹
CNTL maximum sink current	25mA ¹
CNTL maximum source current	25mA ¹

NOTES:

1. These values are characterized but not tested.

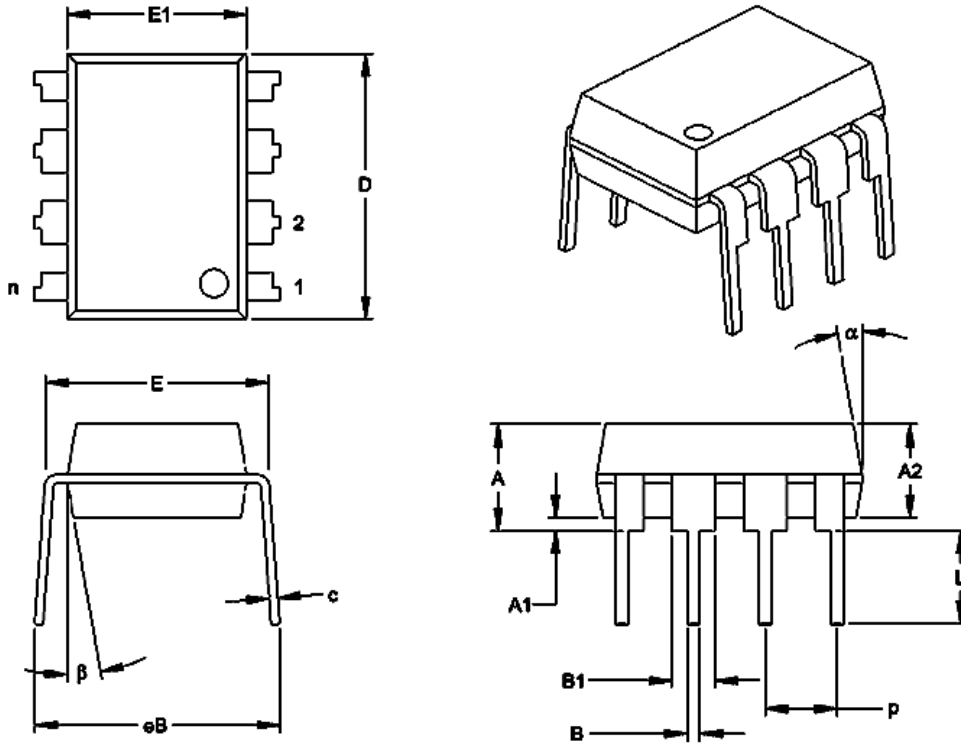


5.0 Ordering Information



6.0 Mechanical Information

8-Lead Plastic Dual In-line (P) – 300 mil (PDIP)



		Units	INCHES*			MILLIMETERS		
Dimension Limits			MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n			8			8	
Pitch	p			.100			2.54	
Top to Seating Plane	A		.140	.155	.170	3.56	3.94	4.32
Molded Package Thickness	A2		.115	.130	.145	2.92	3.30	3.68
Base to Seating Plane	A1		.015			0.38		
Shoulder to Shoulder Width	E		.300	.313	.325	7.62	7.94	8.26
Molded Package Width	E1		.240	.250	.260	6.10	6.35	6.60
Overall Length	D		.360	.373	.385	9.14	9.46	9.78
Tip to Seating Plane	L		.125	.130	.135	3.18	3.30	3.43
Lead Thickness	c		.008	.012	.015	0.20	0.29	0.38
Upper Lead Width	B1		.045	.058	.070	1.14	1.46	1.78
Lower Lead Width	B		.014	.018	.022	0.36	0.46	0.56
Overall Row Spacing	eB		.310	.370	.430	7.87	9.40	10.92
Mold Draft Angle Top	α		5	10	15	5	10	15
Mold Draft Angle Bottom	β		5	10	15	5	10	15

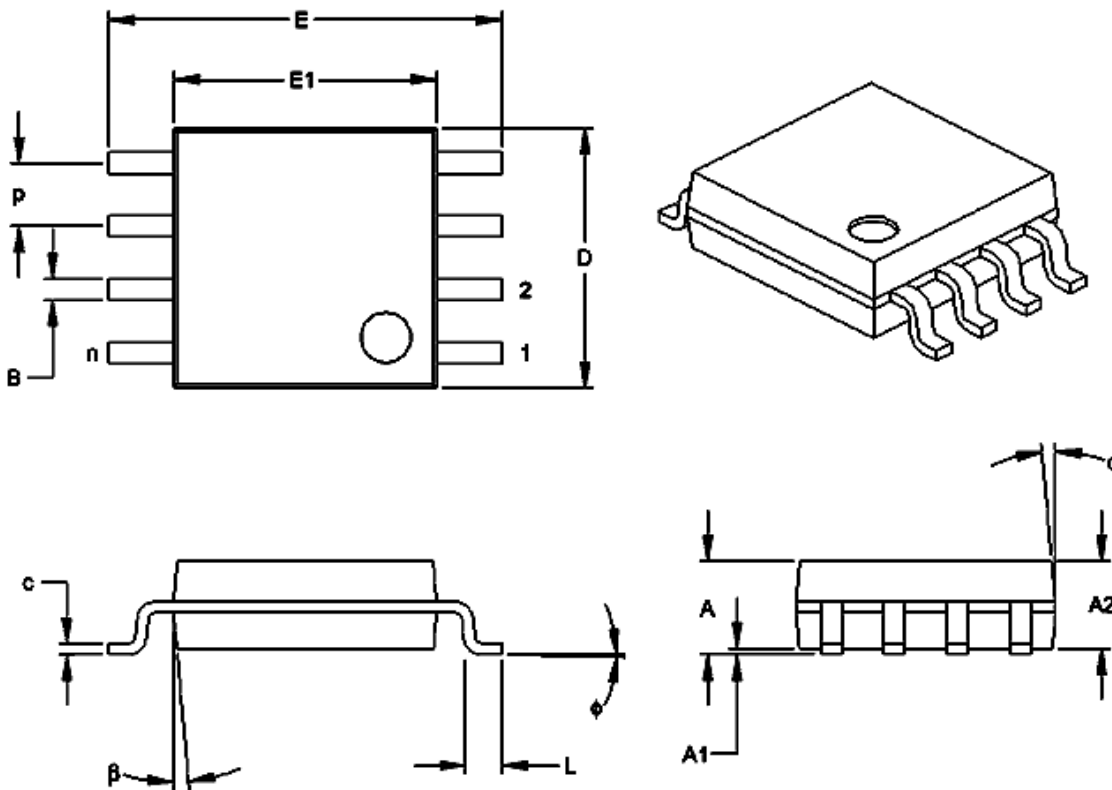
*Controlling Parameter

Notes:

Dimensions D and E1 do not include mold flash protrusions. Mold flash or protrusions shall not exceed .010" (0.254mm) per side.

JEDEC Equivalent: MS-001

8-Lead Plastic Small Outline (SM) – Medium, 208 mil (SOIC)



Units		INCHES*			MILLIMETERS		
Dimension Limits		MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n		8			8	
Pitch	P		.050			1.27	
Overall Height	A	.070	.075	.080	1.78	1.97	2.03
Molded Package Thickness	A2	.069	.074	.078	1.75	1.88	1.98
Standoff	A1	.002	.005	.010	0.05	0.13	0.25
Overall Width	E	.300	.313	.325	7.62	7.95	8.26
Molded Package Width	E1	.201	.208	.212	5.11	5.28	5.38
Overall Length	D	.202	.205	.210	5.13	5.21	5.33
Foot Length	L	.020	.025	.030	0.51	0.64	0.76
Foot Angle	ϕ	0	4	8	0	4	8
Lead Thickness	c	.008	.009	.010	0.20	0.23	0.25
Lead Width	B	.014	.017	.020	0.36	0.43	0.51
Mold Draft Angle Top	α	0	12	15	0	12	15
Mold Draft Angle Bottom	β	0	12	15	0	12	15

*Controlling Parameter

Notes:

Dimensions D and E1 do not include mold flash protrusions. Mold flash or protrusions shell should not exceed .010" (0.254mm) per side.



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